Florida

Department of Environmental Protection

Bioassays of City of

Homestead Municipal Power Plant

Homestead, Dade County, Florida

NPDES #FL0002721

Sampled 5/12/93

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August 1993

Biology Section
Division of Technical Services

Bioassays of City of

Homestead Municipal Power Plant

Homestead, Dade County, Florida

NPDES #FL0002721

Biology Section
Bureau of Laboratories
August 1993

Introduction

City of Homestead Municipal Power Plant, Homestead, Dade County, Florida, NPDES #FL0002721, tests performed on 13 to 15 May, 1993

This facility, located at 675 North Flagler Avenue in Homestead, is an electric power generating plant which produces 1 to 25 MW for the City of Homestead. The maximum design-capacity of the plant is 59 MW. The plant has 16 dual-fueled generators which burn diesel or natural gas. Approximately 2.3–7.6 MGD of once-through cooling water (OTCW) from the Biscayne aquifer is passed through a heat exchanger serving 12 of the generators. A cooling tower for two of the remaining four generators contributes a negligible amount to the OTCW stream (900 gpd). The final two generators are radiator-cooled and produce no wastewater. The combined OTCW stream discharges into Mowry Drive ditch which flows to the Class III waters of Card Sound via canal C-103S (NPDES files).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition (EPA/600/4-90/027).

Results and Discussion

The FDEP Biology Section performed two 48-hour acute screening toxicity bioassays on a sample of effluent from this facility. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi* (formerly *Notropis leedsi*). The *C. dubia* test was invalidated due to excessive control mortality. No mortality occurred in the *C. leedsi* test. The test results did not indicate toxicity to the *C. leedsi*. Total residual chlorine and total ammonia were not detected in the sample.

Conclusion

The sample of effluent collected from this facility on 12 May, 1993, did not show toxicity to *C. leedsi*. The *C. dubia* test was invalidated due to excessive control mortality.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the Homestead Power Plant effluent performed on 13 to 15 May, 1993.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
100 %	0 mL	20 mL	20 mL

Cyprinella leedsi (bannerfin shiner, formerly *Notropis leedsi*)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Homestead Power Plant, Homestead, Dade County, Florida, NPDES# FL0002721, performed on 13 to 15 May, 1993.

Facility:	**Homestead Municipal Power Plant**		NPDES #	FL0002721	Facility Type: **Electric Generating Plant**
Location:	Homestead		Contact / District:	Tim Powell / SE	
County:	Dade		Test type:	static acute screen	
Sample Collection Date:	5/12/93	Time: 1130	# tests:	2	Receiving Water: **Card Sound**
Test Beginning Date:	5/13/93	Time: 1100	Chlorination Type:	not chlorinated	
Test Ending Date:	5/15/93	Time: 1100			**Page 1 of 1**

Total Residual Cl2	mg/l	Method
Field:	not measured	
Lab:	< 0.03	DR-100

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	<0.017	0.00
20% Dilute Mineral Water (cladocerans):	<0.017	0.00
100% Sample:	<0.017	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	125
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	220	235

Salinity (ppt)	
Control Water:	0
100% Sample:	0

Organism: ***Ceriodaphnia dubia*** * Life stage: < 24 hours

	SURVIVAL *			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	2 *	8.1	-	8.1	23.6	-	23.5	7.5	-	7.1	145	170
Control	5	5	3 *	-	-	8.1	-	-	-	-	-	7.1	-	180
Control	5	5	1 *	-	-	8.1	-	-	-	-	-	7.1	-	180
Control	5	5	2 *	-	-	8.1	-	-	-	-	-	7.4	-	180
100%	5	5	1	8.1	-	8.2	24.3	-	23.5	6.6	-	7.2	575	466
100%	5	5	5	-	-	8.2	-	-	-	-	-	7.3	-	490
100%	5	5	2	-	-	8.2	-	-	-	-	-	7.3	-	500
100%	5	5	3	-	-	8.2	-	-	-	-	-	7.0	-	620

* Test invalidated at 48 hours because of excessive control mortality.

Organism: ***Cyprinella leedsi*** Age: 10 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	5	7.8	8.1	8.3	22.9	23.5	23.0	7.9	8.2	7.4	240	225
Control	5	5	5	7.8	8.1	8.3	-	-	-	7.9	8.2	7.4	245	240
100%	5	5	5	7.4	8.1	8.2	25.0	23.6	22.9	6.2	7.7	7.2	630	550
100%	5	5	5	7.4	8.1	8.2	-	-	-	6.2	7.7	7.2	630	550

Sample Source: Homestead Power Plant
Location:
County: DADE
Contact/District: TIM POWELL / SE
NPDES Permit #: FL0002721 Outfall #: 93MAY13 09 01 55235

Sample Collection: Date 5-12-93 Time 1130
Test Beginning: Date 5-13-93 Time 1100
Test Ending: Date 5-15-93 Time 1100
Organism Batch #: 21 Diluent Batch #: 8
Organism Age: < 24 hrs
Test Organism: Ceriodaphnia Dubia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks: INVALID excess Control mortality

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.8	8.4 @ 23.7	980 @ 1,000 @ 24.0 9880 @ 10,000
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.7	8.4 @ 23.8	980 @ 1,000 @ 24.1 9890 @ 10,000
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.5	8.4 @ 24.0	960 @ 1,000 @ 24.0 9690 @ 10,000

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temperature (°C) 0	24	48	D.O. (mg/L) 0	24	48	~~Cond. (mmhos/cm)~~ Cond. (µmhos/cm) 0	24	48
Control	A	5	5	2	8.1		8.1	23.6	23.5	LB 24.1	7.5		7.1	145		170
Control	B	5	5	3			8.1			LB 24.1			7.1			180
Control	C	5	5	1			8.1			LB 24.1			7.1			180
Control	D	5	5	2			8.2			LB 24.1			7.4			180
100%	A	5	5	1	7.5		8.2	24.3	23.5	LB 24.2	6.6		7.2	575		466
100%	B	5	5	5			8.2			LB 24.3			7.3			490
100%	C	5	5	2			8.2			LB 24.3			7.3			500
100%	D	5	5	3			8.2			LB 24.0			7.0			~~600~~ LB 620
Measured/Loaded by:		TR	TR	LB	TM		LB	TM	LB		TM		LB	TM		LB
Recorded by:		TR	TR	LB	TR		LB	TR	LB		TR		LB	TR		LB

RECORDED D.O.'S IN TEMP COLUMN - LB - 5/15/93

RECORDED WRONG # HERE LB 5/15/93

Investigators' Signatures
Robin C. Rader
Tina Mikulski
Lyn Burton

Reviewer

form updated 10/20/92

	~~Salt Water~~ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	25	70	220	Hach	TR
Hardness:	125	80	235	Hach	TR
Total Ammonia:	<0.017	<0.017	<0017	Orion	MF

Water Quality Parameters

Cl_2 Blank: _____ Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Sample Salinity: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Homestead Power Plant
Location:
County: DADE
Contact/District: TIM POWELL / SE
NPDES Permit #: FL00 027721 Outfall #:
93MAY13 0901 55235

Sample Collection: Date 5-12-93 Time 1130
Test Beginning: Date 5-13-93 Time 1100
Test Ending: Date 5-15-93 Time 1120
Organism Batch #: 20 Diluent Batch #: Well
Organism Age: 10 days
Test Organism: Notropis Leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 2 of 2
Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.8	8.4 @ 23.7	980 @ 1,000 @24 9880 @ 10,000
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.7	8.4 @ 23.8	980 @ 1,000 @24 9890 @ 10,000
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.5	8.4 @ 24.0	[illegible] @ 1,000 @24 9GD 9690 @ 10,000

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temperature (°C) 0	24	48	D.O. (mg/L) 0	24	48	~~Cond. (mmhos/cm)~~ Cond. (µmhos/cm) 0	24	48
Control A	63	5	5	5	7.8	~~7.8~~	8.3	22.9	23.5	23.0	7.9	8.2	7.4	240	245	225
Control B	65	5	5	5	7.8	~~7.8~~	8.3				7.9	8.2	7.4	245	250	240
100% A	630	5	5	5	7.4	~~7.4~~	8.2	25.0	23.6	22.9	6.2	7.7	7.2	630	600	550
100% B	25	5	5	5	7.4	~~7.4~~	8.2				6.2	7.7	7.2	630	600	~~550~~
						*8.1	recorded									
						8.1	wrong TR 5/14/93									
						*2										
						8.1	recorded									
						8.1	wrong TR 5/14/93									
Measured/Loaded by:		TM	TR	LB	TM	TR	LB	TR	TR	LB	TR	TR	LB	TR	TR	LB
Recorded by:		TM	TR	LB	TR	TM	LB	TM	TM	LB	TM	TM	LB	TM	TM	LB

Investigators' Signatures
Tobin A. Rader
Tina Mikulski
Lynn Burton

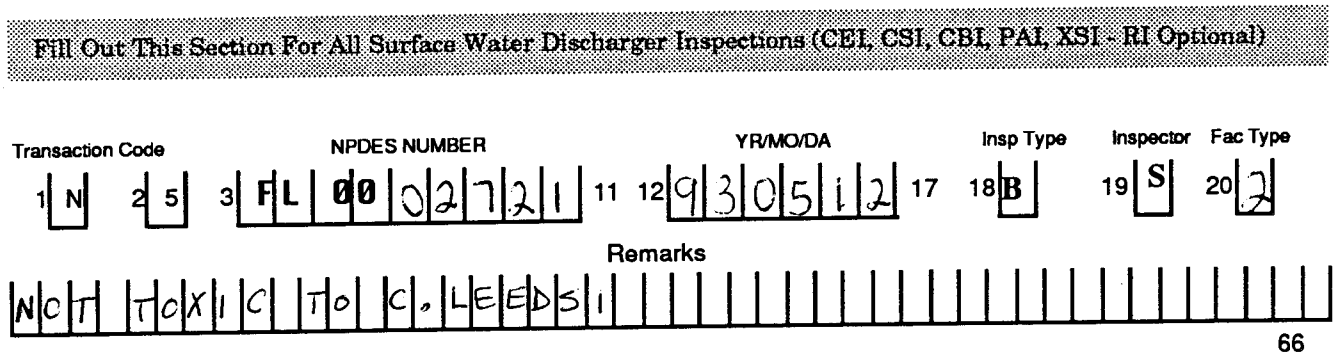
Reviewer

form updated 10/20/92

Water Quality Parameters	~~Salt Water~~ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	220	Hach	TR
Hardness:	125	80	235	Hach	TR
Total Ammonia:	<0.017	<0.017	<0.017	ORION	MF

Cl_2 Blank: _____ Ammonia Meter Slope: _____ Ammonia Blank: _____ Sample Salinity: _____ ppt

The Bioassay of Homestead Power Plant effluent sampled on May 12, 1993, NPDES #FL0002721.



The Priority Pollutants Analyses for the Bioassay of Homestead Power Plant effluent sampled on May 12, 1993, NPDES #FL0002721.

